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Using adaptive regressions for analysis of server time parameters

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Abstract

© SGEM2018. A model of traffic dynamics of the University server node is described, interpretation of the proper model components is carried out, and the interval of a satisfactory forecast is estimated. Currently, corporate computer networks play an important role for the successful functioning of various organizations. Herewith, the number of each network users gradually increases, which contributes to an increase in the circulating information content and, accordingly, worsening the quality of network services. To date, list of statistical methods used in data processing characterizing the intensity of the server node traffic is rather limited. Mathematical models of traffic are generally constructed on the assumption of its stationarity. In this connection, there is a need for further research on this issue. The aim of the research is to improve the accuracy of describing the server node traffic dynamics by applying adaptive regressions. To achieve this goal, we used an approach of dynamic adaptive regression modeling (DARM-approach), represented in the form of an automated system. DARM-approach is an implementation of a multi-stage structural and parametric identification of time series model (TSM). At each stage of the DARM-approach application, the construction and analysis of the proper TSM model's component, estimation of its accuracy of approximation (ε) and forecasting (Δε), diagnostics of residues properties, and adaptation, if necessary, are performed. In the modeling of web traffic, the increasing trend indicating that the information content increases from the beginning (September) to the end (May) of school year is revealed. Two harmonics with periods of 24 hours and 6-6,5 months are identified. The period of 24 hours indicates that the traffic increases gradually from the beginning of the day and during the first half of the day, reaching its peak by the middle of the day, then gradually decreases, and by the end of the day takes its minimum value. The period of 6-6,5 months characterizes the fact that in the summer holidays, winter holidays, and vacation the traffic is reduced, the active use of site resources begins with the start of the semester, rising to its completion.

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Keywords

Adaptive regression analysis, Dynamic robust modeling, Multiple analysis

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